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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/665,335	09/18/2003	Alfred I-Tsung Pan	200313618-1	5438

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FORT COLLINS, CO 80527-2400

EXAMINER
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PERT, EVAN T

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/665,335

Applicant(s)

PAN ET AL.

Examiner

Evan Pert

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 13-34 and 37-43 is/are rejected.
- 7) ☒ Claim(s) 11, 12, 35 and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>0805</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. For all prior art rejections in this Office Action, the examiner takes Official Notice that “nanotubes”, such as “carbon nanotubes” or “CNTs” *implicitly* “have an aspect ratio of at least about 5:1” unless they are specifically described otherwise, such as being cut to extremely short lengths, so short that they aren’t really “tubes” any more.

For supporting evidence that “CNTs” (universally) implicitly and even inherently “have an aspect ratio of at least about 5:1”, see 10/269,577, specification, p. 1, lines 10-15, (i.e. [0003] of US 2005/0202578 A1), which states:

Carbon nanotubes (CNTs) come in two families, single wall nanotubes (SWNTS) and multi-wall nanotubes (MWNTS). Both materials are long (11 - 10,000 microns) and thin (0.001 - 0.1 microns in diameter). This **high aspect ratio** and the fact that they are semiconducting or metallic...”

3. Claims 1, 2, 4, 5, 6, 7, 9, 10, 13, 14, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 37, 42 and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by Shibuta (US 5,908,585):

See col. 1, line 58 to col. 2, line 20; col. 3, line 24 to col. 4, line 14; col. 5, line 55 to col. 6, line 65, especially col. 6, lines 50-53 for "printable" limitation.

4. Claims 1, 2, 4, 5, 6, 7, 8, 18, 21, 22, 23, 26, 27, 28, 29, 30, 32, 33, 37, 38 and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Sheu et al. (US 6,705,910):

See Fig. 1g; col. 1, lines 17-22; col. 1, lines 27-44; col. 3, lines 3-7; col. 3, lines 32; col. 5, lines 23-29; col. 5, lines 34-41].

5. Claims 1, 2, 4, 5, 6, 7, 9, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 28, 29, 30, 31, 37, 38, 42 and 43 are rejected under 35 U.S.C. 102(e) as being anticipated by Glatkowski et al. (US 2003/0164427 A1): See [0041], [0053], [0054].

6. Claims 1, 2, 4, 5, 6, 7, 9, 28, 29, 30, 31, 37 and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Yaniv et al. (10/269,577 filed Oct. 11, 2002, published as part of US 2005/0202578 A1 on September 15, 2005):

See specification, p. 1, lines 10-21; p. 3, lines 17-22; p. 4, lines 1-6; "ink jet" at p. 5, lines 3-5.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over any of Yaniv et al., Glatkowski et al., Sheu et al., or Shibuta, as applied to claim 2 above, and further in view of Shibuta (US 5,908,585) with Friend (US 5,098,771).

The prior art is silent about the shape of nanostructures in a conductive ink as being comprised of “nanobelts, nanoplates, nanodiscs, and combinations thereof.”

The Friend and Shibuta references reference disclose that conductive particles or microfibers in a conductive ink are not limited to particular shapes for good conductivity of the printed layer, although shapes having a high aspect ratio are known to be advantageous in a conductive ink [col. 3, line 53 to col. 4, line 5 and col. 2, lines 15-20 of the Shibuta reference with col. 2, lines 14-16 with col. 1, lines 54-62 of the Friend reference, stating that an aspect ratio “of at least 5” for conductive particles in a conductive ink is “preferable”].

It would have been obvious to one of ordinary skill in the art at the time of the claimed invention, having knowledge that small conductive particles in an ink can make the ink conductive, to add any type of particle that is conductive and stable to form an ink that will dry with a contiguous electrical path among conductive particles in the cured conductive ink.

The prior art discloses nanowires (nanorods) in a conductive ink, and not the more recently available “nanobelts, nanoplates, nanodiscs or combinations thereof”, yet applicant presents no unexpected results using “nanobelts, nanoplates, nanodiscs or combinations thereof” as opposed to nanowires, such as nanotubes.

The MPEP explains that, when there are no unexpected results, the courts have held that subject matter is not patentable when the only claimed difference is “shape” and/or “size.”

See MPEP 2144.04(IV), (A) and (B).

9. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over any of Yaniv et al., Glatkowski et al., Sheu et al. , or Shibuta, as applied to claim 1 above, and further in view of and further in view of Eklund et al. (US 6,139,919).

The prior art relied on for rejection of claim 1 is silent about the “nanostructures” being “doped,” only that an increase in conductivity of conductive ink is advantageous.

The Eklund et al. teaches that it is advantageous to have “doped” nanotubes when higher conductivity is desired, such as in the references to Yaniv et al., Glatkowski et al., Sheu et al. , and Shibuta.

It would have been obvious to use doped nanostructures as the nanostructures added to conductive ink in any of Yaniv et al., Glatkowski et al., Sheu et al. , or Shibuta, motivated to achieve higher conductivity of the conductive ink as it is known to the ordinary of skill in the art that higher conductivity particles in a conductive ink would increase conductivity of the ink [MPEP 2144].

9. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yaniv et al. (10/269,577 filed Oct. 11, 2002, published as part of US 2005/0202578 A1 on September 15, 2005):

Claim 41 recites prior art limitations of “a system” having prior art “ink jet” elements, such as a “firing chamber reservoir” and “ink-jetable composition” wherein the “ink-jetable composition” is anticipated by the prior art rejections of claim 1 above.

It would have been obvious to one of ordinary skill in the art to implement a “system” with “ink jettable composition” as claimed, motivated at the suggestion of the Yaniv et al. to “ink jet” a “conductive composition” having “nanotubes” that have “an aspect ratio of at least about 5:1” [MPEP 2144].

***Allowable Subject Matter***

10. Claims 11-12 and 35-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. Applicant's arguments (with respect to claims rejected in the last Office Action) have been considered but are moot in view of the new grounds of rejection.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US 20050156504A1	e.g. [0069]
US006914381B2	e.g. col. 8, lines 45-48
US 20050095360A1	e.g. [0023]
US006713947B2	e.g. col. 11, lines 35-44
US 20030122111A1	e.g. [0037], [0049]
US005853877A	e.g. problem of agglomeration

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP  
October 3, 2005

  
**EVAN PERT**  
**PRIMARY EXAMINER**